

WHAT IS CLAIMED IS:

1. A microactuator device, comprising:

at least a pair of polymeric sheets each having conductive and dielectric films deposited thereon, the polymeric sheets facing each other and bonded together to create at least one cell having a substantially circular shape parallel to a plane in which the polymeric sheets lie, the at least one cell having at least one egress hole to allow a fluid to pass there through when a source of electric potential is applied to the conductive films to cause a portion of the polymeric sheets in the vicinity of a perimeter of the cell to be attracted to one another and thereby cause the cell to retract.

2. The microactuator device of claim 1, comprising a plurality of cells.

3. The microactuator device of claim 2, comprising a plurality of pairs of polymeric sheets laminated to each other to form a stack.

4. The microactuator device of claim 1, wherein one of the pair of polymeric sheets is substantially flat.

5. The microactuator device of claim 1, wherein each one of the pair of polymeric sheets is bowed.

6. The microactuator device of claim 1, further comprising adhesive for bonding the polymeric sheets.

7. An electrostatic microactuator, comprising:

a plurality of substantially circular cells arranged in a predetermined pattern and obtained by bonding sheets of polymeric material together with substantially circular patterns;

at least one fluid egress passage provided in each of the cells;

the sheets of polymeric material including conductive and dielectric films disposed thereon such that when a source of electric potential is applied to the conductive films the polymeric sheets in the vicinity of a perimeter of each of the cells are attracted to one another to cause the cells to contract.

8. The microactuator device of claim 7, comprising a plurality of pairs of polymeric sheets laminated to each other to form a stack.

9. The microactuator device of claim 7, wherein one of the polymeric sheets is substantially flat.

10. The microactuator device of claim 7, wherein a portion of each of the polymeric sheets associated with a given cell is bowed.

11. The microactuator device of claim 7, further comprising adhesive for bonding the polymeric sheets.

12. An electrostatic microactuator, comprising:
a first polymeric sheet having a conductive film and a dielectric film disposed thereon;
a second polymeric sheet having a conductive film and a dielectric film disposed thereon;
and
an adhesive disposed and patterned between the sheets to provide a plurality of
substantially circular cells, wherein each of the cells includes a fluid egress hole,
wherein the cells are operable to contract as a result of an electrostatic force created upon
application of an electrical potential to the respective conductive films of the first and second
polymeric sheets.

13. The electrostatic microactuator of claim 12, comprising a plurality of pairs of
polymeric sheets laminated to each other to form a stack.

14. The electrostatic microactuator of claim 12, wherein one of the polymeric sheets is
substantially flat in the vicinity of a given cell.

15. The electrostatic microactuator of claim 12, wherein a portion of each of the
polymeric sheets associated with a given cell is bowed.

16. A microactuator device that minimizes energy loss, comprising a plurality of electrostatically controllable cells disposed adjacent one another, at least one of the cells having a substantially circular shape, wherein the at least one of the cells exhibits a substantial constant velocity pull in after a threshold pull in voltage is applied to opposing surfaces of the at least one cell.

17. The microactuator device of claim 17, wherein the device is comprised of a pair of polymeric sheets.

18. The microactuator device of claim 17, comprising a plurality of layers of cells.

19. A microactuator device that minimizes energy loss, comprising a plurality of electrostatically controllable cells disposed adjacent one another, at least one of the cells having a substantially circular shape, wherein a force generated by the at least one of the cells, after a threshold pull in voltage is applied to opposing surfaces of the at least one cell, is independent of displacement.

20. The microactuator device of claim 19, wherein the device is comprised of a pair of polymeric sheets.

21. The microactuator device of claim 19, comprising a plurality of layers of cells.